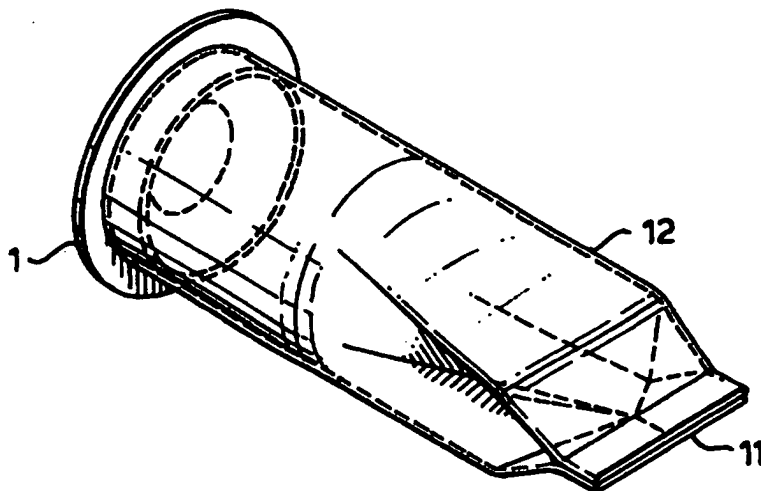




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: <b>PCT/GB96/02837</b></p> <p>(22) International Filing Date: <b>19 November 1996 (19.11.96)</b></p> <p>(30) Priority Data: <b>9524628.6</b>      <b>1 December 1995 (01.12.95)</b>      <b>GB</b></p> <p>(71) Applicant (for BB GB IE KE LS MW SD SZ TT UG only): <b>CARNAUDMETALBOX PLC [GB/GB]; Downsview Road, Wantage, Oxfordshire OX12 9BP (GB).</b></p> <p>(71) Applicant (for AT BE BF BJ CF CG CH CI CM DE DK ES FI FR GA GN GR IT LU MC ML MR NE NL NO PT SE SN TD TG only): <b>CARNAUDMETALBOX S.A. [FR/FR]; 67, rue Arago, F-93400 Saint-Ouen (FR).</b></p> <p>(71) Applicant (for AL AM AU AZ BG BR BY CN CZ EE GE HU IL IS JP KG KP KR KZ LK LR LT LV MD MG MK MN NZ PL RO RU SG SI SK TJ TM TR UA UZ VN only): <b>CARNAUDMETALBOX N.V. [NL/NL]; Anodeweg 3, NL-1627 LJ Hoom (NL).</b></p> <p>(71) Applicant (for CA MX only): <b>CARNAUDMETALBOX (HOLDINGS) USA INC. [US/US]; Suite 1300, 1105 North Market Street, Wilmington, DE 19801 (US).</b></p>	<p>(72) Inventor; and (75) Inventor/Applicant (for US only): <b>PRINCE, Cyril, Miles [GB/GB]; Wychwood Cottage, Dolly End, Hailey, Witney, Oxfordshire OX8 5XB (GB).</b></p> <p>(74) Agent: <b>GADSDEN, Robert, Edward; Carnaudmetalbox plc, Downsview Road, Wantage, Oxfordshire OX12 9BP (GB).</b></p> <p>(81) Designated States: <b>AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</b></p> <p>Published With international search report.</p>	

(54) Title: CONTAINERS



## (57) Abstract

A compartmented container, such as an aerosol container, has a plastics pouch (12) attached to a top component such as an aerosol cone (1). The cone is typically formed of steel laminated with polypropylene, and the pouch is attached to the cone by means of a plastics/plastics heat-sealed bond using the polypropylene surface layer of the cone. The pouch is attached to the cone (1) at an area away from that used to attach the cone to an aerosol container with a double seam. The cone typically has an annular countersink (4) and the pouch is attached either to the outer countersink wall (5) or the inner countersink wall (6).

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"CONTAINERS"

The present invention relates to compartmented containers i.e. containers having a bag or diaphragm to separate the interior of the container into at least two sections. Such compartmented containers have found  
5 widespread use in aerosols where it is desirable to separate the propellant gases from the contents to be dispensed from the container.

UK patent application No. 2024334A is an example of such a compartmented aerosol container, which uses an  
10 adhesive to secure a plastics pouch to the sidewall of the aerosol can. More commonly, the pouch or bag is secured by crimping the top of the bag into the double seamed joint between the can body and the top component such as an aerosol cone. The present invention attempts  
15 to avoid the use of adhesives, and the problems of tearing the bag when it is secured by means of the double seam.

Accordingly there is provided a method of manufacturing a compartmented container characterised by  
20 the steps of:

- i. forming a plastics pouch being open at at least one of its ends;
- ii. forming a metallic top component having at least one surface thereof coated with a  
25 polymeric layer;
- iii. heat-sealing the open end of the pouch and the top component one to the other by means of a plastics/plastics bond between the pouch and the polymeric layer of the top component;
- 30 iv. inserting the pouch into a tubular container body such that the top component is adjacent one open end of the container body; and

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- v. securing the top component onto the container body by means of a seaming operation.

The top component preferably includes an annular countersink, and the open end of the pouch is heat-sealed to a wall of the annular countersink. Preferably the pouch is heat-sealed to the top component by means of an induction heater. Alternatively, the pouch may be heat-sealed to the top component by means of the injection of a line of molten polymer material in order to bond the panel to the top component one to the other. In this instance the molten polymer material is preferably polypropylene.

The plastics pouch is conveniently formed as a continuous tube and subsequently cut to length. One end of the pouch may be closed and sealed prior to heat-sealing the opposite end to the top component, but more preferably one end is heat-sealed to the top component, and the opposite end is closed and sealed prior to insertion of the pouch in the tubular container.

According to a further aspect of the invention there is provided a compartmented container comprising a tubular container body having an open upper end, a plastics pouch having a closed lower end and an open upper end, and a top component connected to and closing the container body by means of a double seam, the top component being formed of metal and having at least its inner surface coated with a polymeric layer characterised in that the open upper end of the plastics pouch is heat-sealed to the top component at an area away from that of the double seam by means of a plastics/plastics bond between the pouch and the polymeric layer on the top component.

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The term "coated" is herein meant to include metal/polymer laminates such as those of our European patent No. EP 0312302B, as well as other coated techniques for producing metal coils coated with plastics material as will be known by those skilled in the art. Preferably one or both of the tubular container body and the top component are formed of steel coated with a polymeric layer. Conveniently one or both of the tubular container body and the top component have at least their inner surface coated with a layer of polypropylene. Preferably the compartmented container is an aerosol container, and the top component is conveniently an aerosol cone.

According to a further aspect of the invention there is provided, in combination, a top component for an container and a plastics pouch, the top component being formed of metal and having at least one surface thereof coated with a polymeric layer, the top component having a seaming flange portion adapted to be used to attach the top component to a container body by means of a double seam, the plastics pouch being open at at least one of its ends, characterised in that the open end of the pouch is heat-sealed to the top component at an area away from the seaming flange portion by means of a plastics/plastics bond between the pouch and the polymeric layer of the top component. Preferably the plastics pouch is open at one end and closed at the other end, ready for receiving the contents to be dispensed from the container.

The invention will now be further described, by way of example only, with reference to the accompanying drawings, in which;

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Figs.1a to 1c are schematic views of a combination of aerosol top component and plastics pouch in accordance with the present invention;

Fig.2 is a schematic view of an alternative  
5 embodiment of combination in accordance with the present invention;

Fig.3 is a flow diagram showing the manufacture and assembly of aerosol containers in accordance with the present invention;

10 Referring to Fig.1a, an aerosol top component known as a cone is shown generally at 1 and comprises an external flange 2, an internal valve cup orifice 3, and between the two a downwardly depending countersink 4. An outer countersink wall 5 connects the flange 2 to the  
15 countersink 4, whilst an inner countersink wall 6 connects the countersink 4 to the valve cup orifice 3, terminating in a curl 7. The cone 1 is formed of steel laminated with polypropylene.

A plastics tube is shown at 8, also formed of  
20 polypropylene, and having open ends 9 and 10 as shown in Fig.1a. Fig.1b shows the tube 8 being applied to the cone 1, with the open end 9 being fitted over the countersink 4 to form an intimate contact with the outer countersink wall 5. Heat is then locally applied, by  
25 means of an induction heater (not shown) in order to form a plastics/plastics heat-sealed bond between the polypropylene of the tube 8 and that of the polypropylene surface layer of the aerosol cone 1. Once the tube 8 and cone 1 have been secured one to the other, the opposite  
30 end 10 of the tube is formed into a gusset 11 and sealed. The tube 8 is now formed into a bag 12 attached to the

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aerosol cone 1, and the combination of cone and bag can then be inserted into an aerosol container (not shown).

The alternative version of Fig.2 is similar to that of Figs. 1a to 1c and like parts are indicated by means of like reference numerals. The construction differs from Figs. 1a to 1c in that the tube 8 is attached to the inner countersink wall 6. As before, a heat-sealed bond is formed between the polypropylene of the tube 8 and that of the surface of the cone.

Fig.3 indicates the manufacturing process associated with one embodiment of the invention. Polypropylene film of thickness 100 $\mu$  is fed from reel stock 12 and folded into a tube at a folding station 13. The overlapping side seam is welded at 14 and the resulting tube is cut to length at cutting station 15. An accumulator 16 stores the tubes and feeds them to a turret header 17 via a feeder 18.

At the first station of the header aerosol cans are loaded into position. At the second station the tubes are loaded onto mandrels, and the tubes and cones are brought together at the third station. An induction heater applies heat to seal the tubes and the cones one to the other at the fourth and fifth stations, and the resulting combination is allowed to cool through the sixth to eighth stations. At the ninth station the mandrel is withdrawn, and the combination is ejected at the tenth station. The open end of the tube is next formed into a gusset at a base forming station 19, and sealed in place at the sealing station 20. The resulting combination, as shown in Fig.1c or 2 depending on the embodiment, is then inserted into an aerosol can body at insertion station 21. The cone is then double seamed

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onto the can body at a seamer 22, and then passed to a bung insertion station 23, where a rubber bung is inserted into a small aperture at the base of the aerosol can body. The container is then tested before leaving to  
5 be filled with product, after which a valve cup is applied to close the valve cup orifice, and a propellant is introduced through the base of the can via the rubber bung.

As can be seen from the above description, the heat-  
10 sealing of the bag allows a number of different options for the provision of the bag within the aerosol container. Although the use of a monolayer polypropylene bag has been described, alternative materials may be employed, including multilayer arrangements with barrier  
15 materials such as EVOH, PVdC, Polyamides or Polyesters, or even non-polymeric barrier materials such as metal foils or ceramic materials.



**CLAIMS:**

1. A method of manufacturing a compartmented container, characterised by the steps of:

- i. forming a plastics pouch being open at at least one of its ends;
- ii. forming a metallic top component having at least one surface thereof coated with a polymeric layer;
- iii. heat-sealing the open end of the pouch and the top component one to the other by means of a plastics/plastics bond between the pouch and the polymeric layer of the top component;
- iv. inserting the pouch into a tubular container body such that the top component is adjacent one open end of the container body; and
- v. securing the top component onto the container body by means of a seaming operation.

2. A method according to Claim 1 characterised in that the top component includes an annular countersink, and the open end of the pouch is heat-sealed to a wall of the annular countersink.

3. A method according to Claim 1 or Claim 2, characterised in that the pouch is heat-sealed to the top component by means of an induction heater.

4. A method according to Claim 1 or Claim 2, characterised in that the pouch is heat-sealed to the top component by means of the injection of a line of molten

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polymer material in order to bond the pouch and the top component one to the other.

5. A method according to Claim 4, characterised in that the molten polymer material is polypropylene.

6. A method according to any of Claims 1 to 5, characterised in that the plastics pouch is formed as a continuous tube and subsequently cut to length.

7. A method according to any of Claims 1 to 6, characterised by the step of closing and sealing the end of the pouch opposite the end heat-sealed to the top component prior to insertion of the pouch into the tubular container.

8. A compartmented container comprising a tubular container body having an open upper end, a plastics pouch having a closed lower end and an open upper end, and a top component connected to and closing the container body by means of a double seam, the top component being formed of metal and having at least its inner surface coated with a polymeric layer characterised in that the open upper end of the plastics pouch is heat-sealed to the top component at an area away from that of the double seam by means of a plastics/plastics bond between the pouch and the polymeric layer on the top component.

9. A container according to Claim 8, characterised in that one or both of the tubular container body and the top component are formed of steel coated with a polymeric layer.

10. A container according to Claim 8 or Claim 9, characterised in that one or both of the tubular container body and the top component have at least their inner surface coated with a layer of polypropylene.
11. A container according to any of Claims 8 to 10, characterised in that the compartmented container is an aerosol container.
12. A container according to Claim 11, characterised in that the top component comprises an aerosol cone.
13. In combination, a top component for a container and a plastics pouch, the top component being formed of metal and having at least one surface thereof coated with a polymeric layer, the top component having a seaming flange portion adapted to be used to attach the top component to a container body by means of a double seam, the plastics pouch being open at at least one of its ends, characterised in that the open end of the pouch is heat-sealed to the top component at an area away from the seaming flange portion by means of a plastics/plastics bond between the pouch and the polymeric layer of the top component.
14. The combination of Claim 13, characterised in that the plastics pouch is open at one end and closed at the other end.

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15. The combination of Claim 13 or Claim 14,  
characterised in that the top component is an aerosol top  
component.

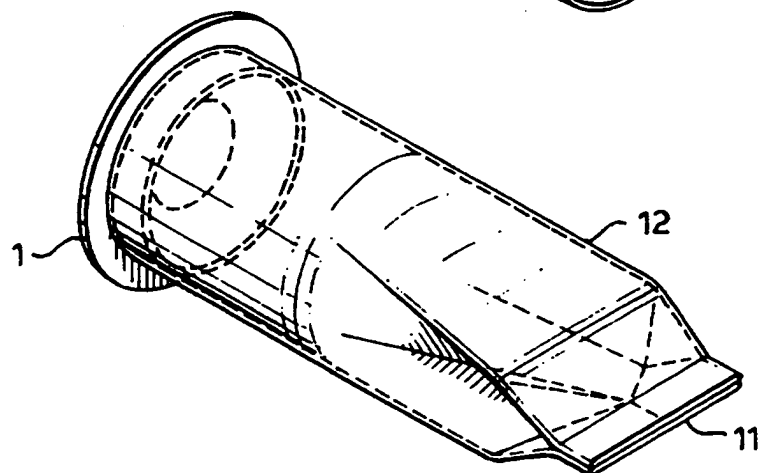
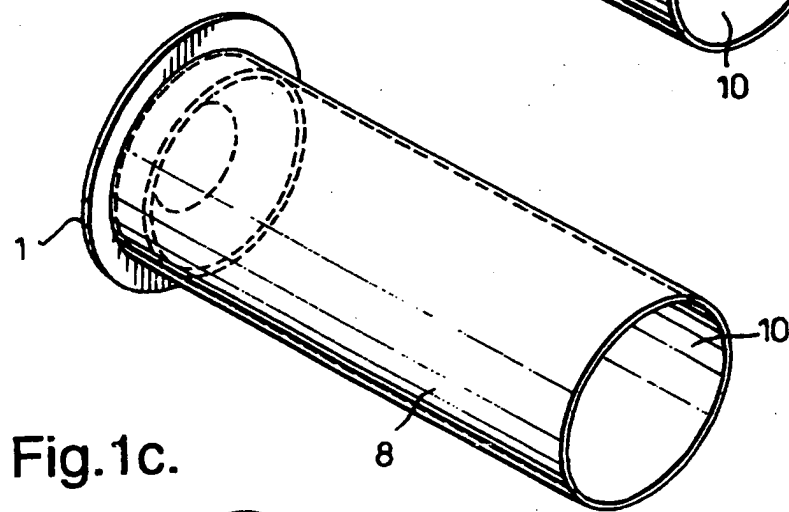
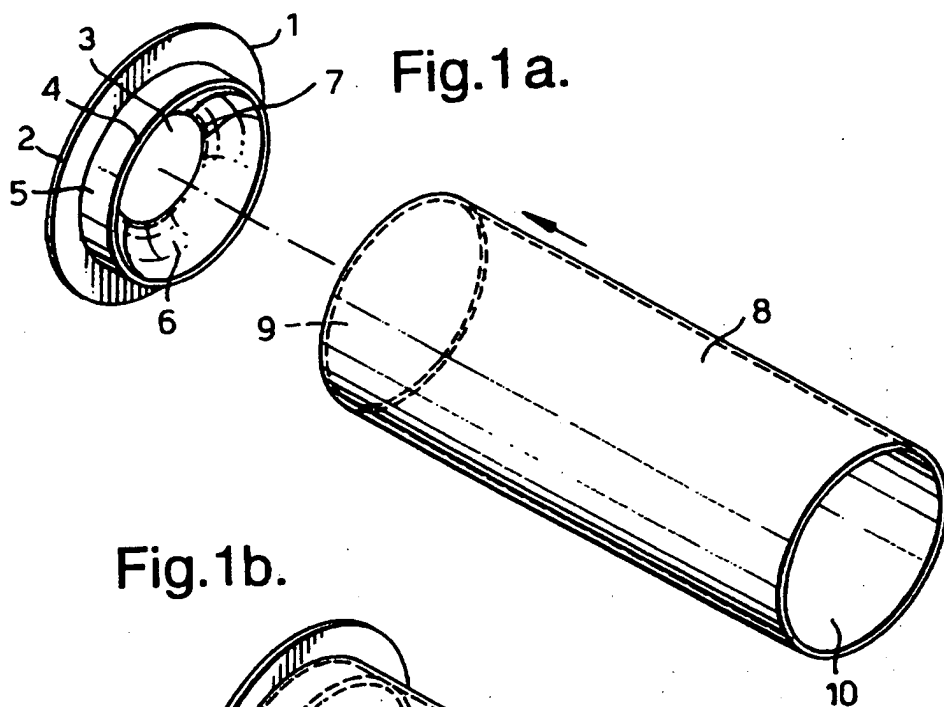
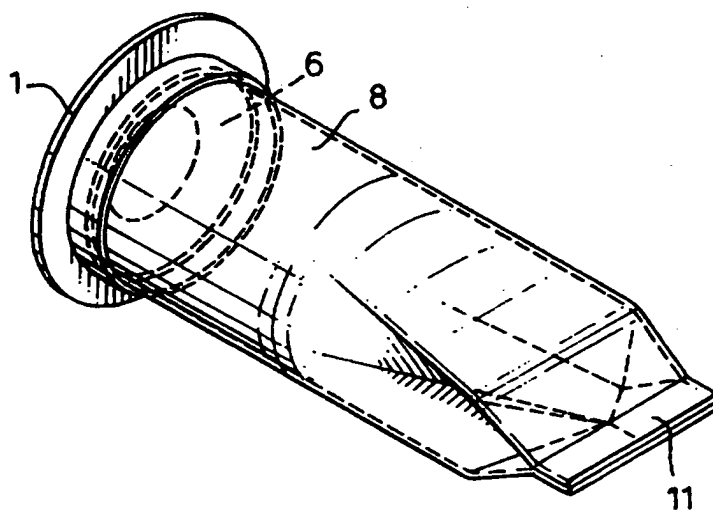
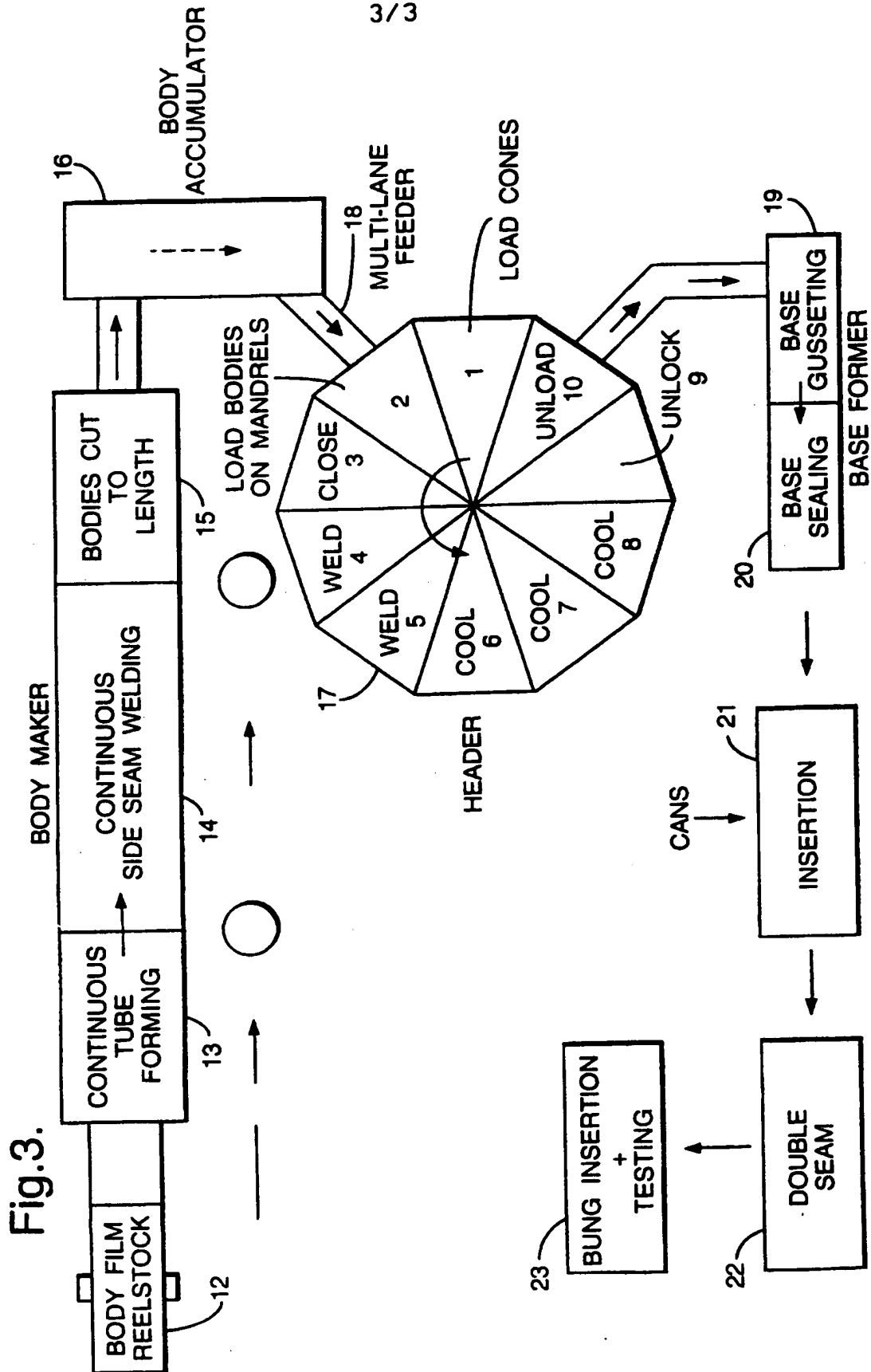


Fig.2.



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## INTERNATIONAL SEARCH REPORT

 Intl. Application No  
 PCT/GB 96/02837

 A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 6 B65D83/62 B29C65/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

 Minimum documentation searched (classification system followed by classification symbols)  
 IPC 6 B65D B29C B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 027 130 A (CONTINENTAL GROUP INC.) 13 February 1980 see page 1, line 64 - page 2, line 9; figures 1,2 ---	1,3,8-15
A	EP 0 354 137 A (CEBAL) 7 February 1990 see column 10, line 27 - column 12, line 22; figures 11-14 ---	1
A	GB 2 024 334 A (CONTINENTAL GROUP INC.) 9 January 1980 cited in the application see page 2, line 4 - line 30; figures 1-6 ---	8,13
A	US 4 293 353 A (PELTON) 6 October 1981 see column 2, line 12 - column 3, line 30; figures 1-6 --- -/--	1,3,8,13

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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